What is claimed is:

1. An aluminum nitride sintered body comprising aluminum nitride as a main component, at least one rare earth metal element in an amount of not less than 0.4 mol% and not more than 2.0 mol% as calculated in the form of an oxide thereof and aluminum oxide component in a amount of not less than 0.5 mol% and not more than 2.0 mol%, wherein Si content is not more than 80 ppm and an average grain diameter of aluminum nitride grains is not more than 3 μm.

2. The aluminum nitride sintered body as claimed in Claim 1, wherein a molar ratio between said at least one rare earth metal element as calculated in the form of an oxide thereof and aluminum oxide component (rare earth metal oxide/aluminum oxide component) is within a range of not less than 0.5 and not more than 1.6.

3. The aluminum nitride sintered body as claimed in Claim 2, which has micro Vickers hardness of not less than 1100.

4. The aluminum nitride sintered body as claimed in Claim 2, which has four point bending strength of not less than 400 MPa.

5. The aluminum nitride sintered body as claimed in Claim 3, which has four point bending strength of not less than 400 MPa.

6. The aluminum nitride sintered body as claimed in Claim 2, which has thermal conductivity of not less than 130 W/mK.

7. The aluminum nitride sintered body as claimed in Claim 3, which has thermal conductivity of not less than 130 W/mK.

8. The aluminum nitride sintered body as claimed in Claim 2, which has volume resistivity of not less than 1×10^{14} Ω·cm at room temperature.

9. The aluminum nitride sintered body as claimed in Claim 3, which has volume resistivity of not less than 1×10^{14} Ω·cm at room temperature.

10. The aluminum nitride sintered body as claimed in Claim 2, which has four point bending strength of not less than 400 MPa and volume resistivity of not less than 1×10^{14} Ω·cm at room temperature.

11. The aluminum nitride sintered body as claimed in Claim 3, which has four point bending strength of not less than 400 MPa and volume resistivity of not less than 1×10^{14} Ω·cm at room temperature.

12. The aluminum nitride sintered body as claimed in Claim 2, which has

a total content of metallic impurity elements other than said at least one rare earth metal element of not more than 300 ppm by weight.

13. The aluminum nitride sintered body as claimed in Claim 3, which has a total content of metallic impurity elements other than said at least one rare earth metal element of not more than 300 ppm by weight.

14. The aluminum nitride sintered body as claimed in Claim 2, which has volume resistivity of not less than 1×10^{14} $\Omega\cdot$cm at room temperature and a total content of metallic impurity elements other than said at least one rare earth metal element of not more than 300 ppm by weight.

15. The aluminum nitride sintered body as claimed in Claim 3, which has volume resistivity of not less than 1×10^{14} $\Omega\cdot$cm at room temperature and a total content of metallic impurity elements other than said at least one rare earth metal element of not more than 300 ppm by weight.

16. The aluminum nitride sintered body as claimed in Claim 2, wherein a total content of metallic impurity elements other than rare earth metal elements in the sintered body is not more than 50 ppm by weight.

17. The aluminum nitride sintered body as claimed in Claim 3, wherein a total content of metallic impurity elements other than rare earth metal elements in the sintered body is not more than 50 ppm by weight.

18. The aluminum nitride sintered body as claimed in Claim 2, which has volume resistivity of not less than 1×10^{14} $\Omega\cdot$cm at room temperature, wherein a total content of metallic impurity elements other than rare earth metal elements in the sintered body is not more than 50 ppm by weight.

19. The aluminum nitride sintered body as claimed in Claim 3, which has volume resistivity of not less than 1×10^{14} $\Omega\cdot$cm at room temperature, wherein a total content of metallic impurity elements other than rare earth metal elements in the sintered body is not more than 50 ppm by weight.

20. A member for a semiconductor-producing apparatus, wherein at least a part of the member consists of the sintered body as claimed in Claim 2.

21. A member for a semiconductor-producing apparatus, wherein at least a part of the member consists of the sintered body as claimed in Claim 3.

22. The member as claimed in Claim 20, comprising a substrate comprising of said sintered body and a metallic member buried therein.

23. The member as claimed in Claim 21, comprising a substrate comprising of said sintered body and a metallic member buried therein.

24. The member as claimed in Claim 22, wherein said metallic member at least comprises an electrode for a heater.

25. The member as claimed in Claim 23, wherein said metallic member at least comprises an electrode for a heater.

26. The member as claimed in Claim 22, wherein said metallic member at least comprises an electrode for an electrostatic chuck.

27. The member as claimed in Claim 23, wherein said metallic member at least comprises an electrode for an electrostatic chuck.

28. The member as claimed in Claim 24, wherein said metallic member at least comprises an electrode for an electrostatic chuck.

29. The member as claimed in Claim 25, wherein said metallic member at least comprises an electrode for an electrostatic chuck.

30. The aluminum nitride sintered body as claimed in Claim 2, which has four point bending strength of not less than 400 MPa, thermal conductivity of not less than 130 W/mK, volume resistivity of not less than 1×10^{14} Ω·cm at room temperature and a total content of metallic impurity elements other than said at least one rare earth metal element of not more than 300 ppm by weight.

31. The aluminum nitride sintered body as claimed in Claim 3, which has four point bending strength of not less than 400 MPa, thermal conductivity of not less than 130 W/mK, volume resistivity of not less than 1×10^{14} Ω·cm at room temperature and a total content of metallic impurity elements other than said at least one rare earth metal element of not more than 300 ppm by weight.

32. A member for a semiconductor-producing apparatus, wherein at least a part of the member consists of the sintered body as claimed in Claim 30.

33. A member for a semiconductor-producing apparatus, wherein at least a part of the member consists of the sintered body as claimed in Claim 31.

34. The aluminum nitride sintered body as claimed in Claim 2, which has four point bending strength of not less than 400 MPa, thermal conductivity of not less than 130 W/mK and volume resistivity of not less than 1×10^{14} Ω·cm at room temperature, wherein a total content of metallic impurity elements other than rare earth metal elements in the sintered body is not more than 50 ppm by weight.

35. The aluminum nitride sintered body as claimed in Claim 3, which has four point bending strength of not less than 400 MPa, thermal conductivity of not less than 130 W/mK and volume resistivity of not less than 1×10^{14} Ω·cm at room temperature, wherein a total content of metallic impurity elements other than rare earth metal elements in the sintered body is not more than 50 ppm by weight.

36. A member for a semiconductor-producing apparatus, wherein at least a part of the member consists of the sintered body as claimed in Claim 34.

37. A member for a semiconductor-producing apparatus, wherein at least a part of the member consists of the sintered body as claimed in Claim 35.

38. The member as claimed in Claim 32, comprising a substrate comprising of said sintered body and a metallic member buried therein.

39. The member as claimed in Claim 33, comprising a substrate comprising of said sintered body and a metallic member buried therein.

40. The member as claimed in Claim 36, comprising a substrate comprising of said sintered body and a metallic member buried therein.

41. The member as claimed in Claim 37, comprising a substrate comprising of said sintered body and a metallic member buried therein.

42. The member as claimed in Claim 38, wherein said metallic member at least comprises an electrode for a heater.

43. The member as claimed in Claim 39, wherein said metallic member at least comprises an electrode for a heater.

44. The member as claimed in Claim 40, wherein said metallic member at least comprises an electrode for a heater.

45. The member as claimed in Claim 41, wherein said metallic member at least comprises an electrode for a heater.

46. The member as claimed in Claim 38, wherein said metallic member at least comprises an electrode for an electrostatic chuck.

47. The member as claimed in Claim 39, wherein said metallic member at least comprises an electrode for an electrostatic chuck.

48. The member as claimed in Claim 42, wherein said metallic member at least comprises an electrode for an electrostatic chuck.

49. The member as claimed in Claim 43, wherein said metallic member at least comprises an electrode for an electrostatic chuck.

50. The member as claimed in Claim 40, wherein said metallic member at least comprises an electrode for an electrostatic chuck.

51. The member as claimed in Claim 41, wherein said metallic member at least comprises an electrode for an electrostatic chuck.

52. The member as claimed in Claim 44, wherein said metallic member at least comprises an electrode for an electrostatic chuck.

53. The member as claimed in Claim 45, wherein said metallic member at least comprises an electrode for an electrostatic chuck.